

REMARKS

Favorable reconsideration of this application, in light of the following discussion, is respectfully requested.

Claims 1-18 and 20 are pending in the present application with Claims 9-14, 16, 17, and 20 withdrawn from consideration. No claims are amended, canceled, or added by the present response.

In the outstanding Office Action, Claims 1-8, 15, and 18 were rejected under 35 U.S.C. § 103(a) as unpatentable over Takehiro (Japanese Patent No. 63-166254) in view of Togawa (Japanese Patent Publication 1-122579), which is respectfully traversed for the following reasons.

Briefly recapitulating, independent Claim 1 is directed to a semiconductor device of an insertion-mount-type having a plastic package and a plurality of leads protruding outward from the plastic package. Each of the leads includes a first lead portion located at a plastic package side, a second lead portion located at a position closer to a lead tip end than the first lead portion, and a third lead portion located at a position closer to the lead tip end portion than the second lead portion, the third lead portion being inserted into a lead-inserting portion. At least some of the leads are formed as gap-controlling leads provided with gap-controlling means to keep a gap between the semiconductor device and an external electric member constant.

Turning to the applied art, Takehiro shows in Figures 3 and 4 a device having one lead 2 with three portions 3, 6, and 4, asserted by the outstanding Office Action to correspond to the claimed first, second, and third lead portions. Further, the outstanding Office Action asserts that the portion (not numbered) between portion 6 and portion 4 corresponds to the claimed gap-controlling means.

However, the portion in Takehiro between portion 4 and portion 6 does not have a side surface configured to contact an external electric member 21, as required by Claim 1. In addition, that portion of Takehiro is configured to enter a lead-inserting portion 22, contrary to Claim 1.

In order to cure these deficiencies of Takehiro, the outstanding Office Action relies on Togawa, which is a foreign reference. In this respect, it is noted that the outstanding Office Action provided only an English Abstract of the foreign reference. Further, the outstanding Office Action appears to rely on Figure 2 of Togawa while the English Abstract of Togawa refers only to Figure 1 of Togawa.

Applicants respectfully submit that based only on Figure 2 of Togawa and no English translation directed to Figure 2, it is not possible to determine whether the asserted lead 5 is a lead protruding outward from a plastic package as required by Claim 1. In this respect, Applicants respectfully submit that neither Figure 1 nor Figure 2 shows that leads 15 and 5 are connected to any plastic package.

The English Abstract provided by the outstanding Office Action appears to suggest that contrary to Claim 1, leads 15 and 5 are not connected to a semiconductor device within a plastic package because lead 15 (see Figure 1) cannot be inserted into the through-hole 14 because of the collar part 15a (if a plastic package is connected to an end of the lead 15 opposed to 15a).

In addition, the English Abstract states that a brazing material 16 is provided “to the **lower surface** of a printing circuit board” (emphasis added) and Figures 1 and 2 show that leads 15 and 5 extend below the lower surface of the printing board. Thus, Togawa discloses that the leads 15 and 5 extend **below** the printed boards 11 and 1, towards the substrate of the device, and not above the printed boards 11 and 1, where semiconductor elements are conventionally formed.

Further, it appears that Togawa is concerned with fixing the printed boards 11 and 1 to the substrate of the device such that the printing board 11 cannot move in an upward position because of the collar part 15a of the lead 15, and also cannot move in a downward position because of the region 5a of the lead 5. In other words, it appears from the drawings that Togawa fixes the printed boards 11 and 1 to the substrate by using the two different types of leads 15 and 5.

Thus, Applicants respectfully submit that the leads of Togawa do not connect to a semiconductor device within a plastic package and thus, the applied art does not teach or suggest this claimed feature.

In addition, the problems associated with fixing a printed circuit board to a substrate are different from fixing a semiconductor device to a printing circuit board (as the weights of the elements are different and the stresses applied are different). Thus, Applicants respectfully submit that one of the ordinary skill in the art would not have any helpful insight to combine the teachings of Takehiro with Togawa.

If the next Office Action relies on Togawa, Applicants respectfully request that an English translation of Togawa be provided in order to determine whether leads 15 and 5 are connected to a semiconductor device within a plastic package as asserted by the outstanding Office Action.

Still regarding Togawa, the outstanding Office Action states at page 5, lines 3-5, that Togawa discloses the feature of “each of said leads being coated with solder (6) using tin as a base material without containing lead on outside of said plastic package for the purpose of improving the fastening strength of lead to an external device” recited in Claim 1 and lacking in Takehiro. Applicants respectfully disagree with this statement for the following reasons.

In the semiconductor device of Claim 1, the lead is coated with the solder before the lead is joined to the lead inserting portion of the external electric member. Then, the lead

coated with the solder is joined to the lead inserting portion, for example by a flow-soldering process or the like. That is, in the semiconductor device of Claim 1, the lead was not joined to the lead inserting portion yet. Thus, the device of Claim 1 advantageously joins the lead to the lead inserting portion.

On the other hand, in the printing circuit board according to Togawa, the leads 5 and 15 have already been joined to the through-holes 4 and 14 of the printing circuit boards 1 and 11 using the brazing materials 6 and 16. Further, Togawa is silent about the state or condition of the leads 5 and 15 before the leads 5 and 15 have been joined to the through-holes 4 and 14. In other words, in the printing circuit board of Togawa, the leads 5 and 15 are not coated with the brazing materials 6 and 16 (or soldering material) before the leads 5 and 15 have been joined to the through-holes 4 and 14, which is contrary to Claim 1.

Thus, Applicants respectfully submit that Togawa, similar to Takehiro, does not teach or suggest that each of the leads being coated with solder using tin as a base material without containing lead on outside of the plastic package for the purpose of improving the fastening strength of the lead to an external device as required by Claim 1.

Accordingly, Applicants respectfully submit that independent Claim 1 and each of the claims depending therefrom patentably distinguish over Takehiro and Togawa, either alone or in combination.

Consequently, in light of the above discussion, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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